EPA Region 5 Records Ctr.
325321

QUALITY MANAGEMENT PLAN (EQUIVALENT)

STANTEC CONSULTING,
REMEDIAL ACTION SUPERVISING CONTRACTOR

FOR:
HAMILTON SUNDSTRAND
AREA 9/10 SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION SUPERFUND SITE

ROCKFORD, ILLINOIS

JULY 2008

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STANTEC CONSULTING

QUALITY MANAGEMENT PLAN

JULY 10, 2008

Concurrence and Approval

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Table of Contents

List Of Tables

List Of Figures

Appendices

LIST OF ACRONYMS

CAD	Computer Aided Design
CDPR	Career Development Performance Review
CPR	Cardiopulmonary Resuscitation
DQA	Data Quality Assessment
DQO	Data Quality Objectives
EMR	Experience Modification Rate
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
FS	Feasibility Study
HS	Hamilton Sundstrand
ISO	International Organization for Standardization
IT	Information Technology
MQO	Measurement Quality Objectives
OSHA	Occupational Safety and Health Administration
PC	Profit Center
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMP	Quality Management Plan
RA	Remedial Action
RD	Remedial Design
RFQ	Request for Quotations
RI	Remedial Investigation
SER	Southeast Rockford Groundwater Contamination Superfund Site
SOP	Standard Operating Procedures
SOW	Statement of Work
Stantec	Stantec Consulting
TSA	Technical Systems Audit

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1.0 MANAGEMENT AND ORGANIZATION

1.1. Mission and Policy Statement

It is the mission of Stantec Consulting (Stantec) to perform the highest level of technical work possible to meet the needs of its clients. To achieve our mission, it is necessary to have a robust Quality Assurance (QA) and Quality Control (QC) program that permeates the entire organization, both top-down and bottom-up. Our policy is to strive to ensure that collected data are complete, representative, and comparable. It is our objective to document quality for all data collected and, where applicable, document data QC in terms of precision and accuracy. Stantec is committed to allocating the necessary funds for ensuring that the QA program is effective and well administered.

1.2. Project Management Framework

To help achieve Stantec's mission, in 2005 an internally-developed project management tool called the 'Project Management Framework' was launched. The Project Management Framework includes an on-line intranet that is accessible to all Stantec staff. The framework includes the following.

- A formal **QA process** ensuring the 'professional-of-record' **reviews and verifies compliance** of work outputs with contract requirements and regulatory standards.
- The **key responsibilities** and activities to be applied by all Stantec Project Managers to our project assignments, organized in four key categories: **Initiate, Plan, Control,** and **Close-out.**
- Direct links to relevant organizational **policies, procedures,** and **practice guidelines** to clarify the intent of each responsibility.
- Direct links to the relevant **forms** and **templates** to ensure everyone is working with a consistent documentation standard.
- Access to **learning modules, subject matter experts,** and relevant **internal communications** that further improve the understanding of each responsibility and provide access to internal expertise.
- Emphasis on **approved contracting practices** for all Stantec projects.
- Focus on a **formal risk management process,** including the implementation of a formal Risk Register template, to identify areas of risk and implement mitigation strategies on a project-specific basis.
- Access to formal **documentation and record control** standards.
- Emphasis on appropriate **project planning** processes.
- Introduction of a formal **third party 'internal audit'** or **project review (QC) process** on larger and complex project types to ensure organization standards are being followed and to implement remedial measures as may be required.
- Introduction of a **formal Client Satisfaction Survey process** to objectively measure that our work outputs meet the requirements of our customers.

Stantec Project Managers are encouraged to provide feedback and suggestions to improve these project management processes to promote our **'continuous improvement'** environment across the organization, which is consistent with ISO 9001:2000 Quality Management requirements. The effectiveness of these tools is largely due to the diversity, professional dedication, and active contributions from our practicing professionals in the promotion of our project management systems.

Corporate resources are allocated through each Practice Area, Region, and Profit Center (PC) within Stantec to insure that QA and QC training is performed and quality management

systems are implemented and followed. Quality management directives are established at the top of the organization and then administered at the Practice Area, Region, and PC levels. Regional Practice Leaders are responsible for ensuring that the PC Managing and Practice Leads understand and implement the corporate Quality Management Plan (QMP). Practice-specific QA/QC Managers review and support the QA and QC processes together with corporate support. Project Managers are responsible for implementing the project specific QMPs and the QA/QC processes. Within projects senior professionals provide direction and review of work within their areas of expertise and professional discipline such as professional engineers, professional geologists, and principal/associate level scientists (toxicologist, risk assessor, biologist, etc.). Project and Staff Scientists and Technicians follow QA and QC protocols on each task they are assigned. This is usually accomplished on a task or project-specific basis as outlined in the Work Plan, Quality Assurance Project Plans (QAPPs), Field Sampling Plans (FSPs), and Standard Operating Procedures (SOPs). An Organizational Chart for this project is provided as Figure 1.

1.3. Quality Management Plan Scope of Application

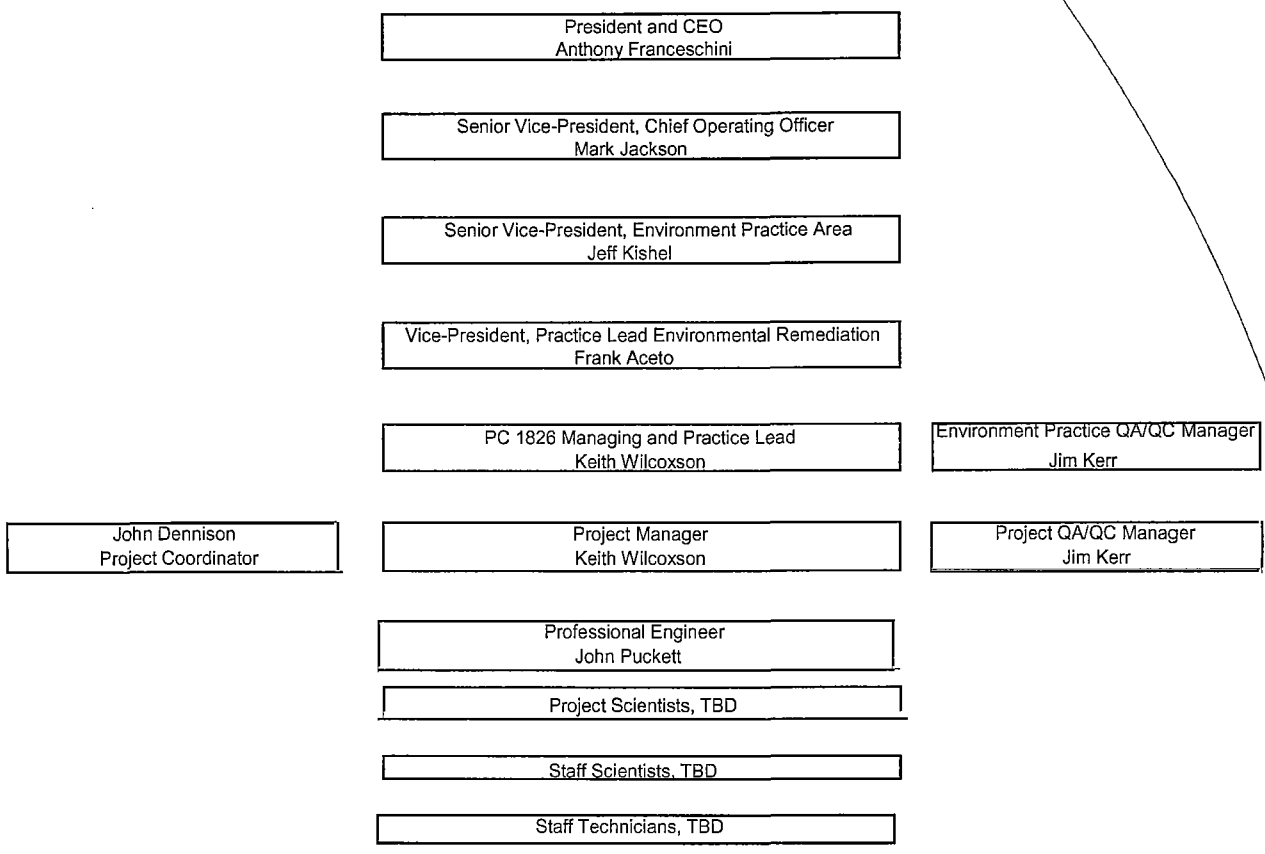
This QMP describes the overall roles and responsibilities of management and staff with respect to QA and QC activities for work performed on Remedial Investigations (RI), Feasibility Studies (FS), Baseline Risk Assessments for Human Health and the Environment, Remedial Design (RD), and Remedial Action (RA). This QMP compliments the project-specific QAPPs, FSPs, and other plans developed specifically for each project.

1.4. Quality System Administration

This QMP describes the Quality System that applies to all work conducted by Stantec. It follows the requirements of the U.S. Environmental Protection Agency (EPA) Requirements for Quality Management Plans QA/R-2 EPA/240/B-001/002 (EPA, March 2001) and meets the requirements of EPA Order 5360.1 A2.

This QMP is provided to all staff, who are expected to read and understand the contents. The Quality Management Plan (Equivalent) Acknowledgement and Agreement Form is provided (See Appendix A) to verify that each employee has read and understands the QMP. The Project QA/QC Manager maintains documentation that staff have read the current version of the QMP.

As updates and amendments are made to the QMP, either the entire document is revised or an amendment is made and distributed to all staff. The Environment Practice QA/QC Manager is responsible for maintaining historical versions of all QMPs.



TBD - To be determined based on the project type, location, and needs.

Figure 1. Organizational Chart

1.5. Roles, Responsibilities, and Quality Assurance and Quality Control Authority

Each Project Manager is ultimately responsible for fulfilling the corporate obligation to provide quality products to Stantec clients. All Stantec staff are responsible for implementing the Quality System requirements routinely in their daily work procedures. The specific responsibilities for implementing the Quality System are summarized below and detailed in Table 1.

There are four general elements of QA and QC that must be addressed for each data collection effort. These are:

- project management;
- data generation and acquisition;
- assessment and oversight; and
- data validation and usability.

Within each PC, the Stantec Project Management Team (comprised of the PC Managing Lead, PC Practice Lead, and PC Project Managers), meets weekly to discuss status and issues related to project management, business performance, resources, ongoing project activities, and performance. QA and QC issues are discussed at these meetings as necessary. Project Scientists, Staff Scientists, and Technicians, usually those involved directly with data generation and acquisition, are then briefed in a separate meeting to address any corrective actions necessary and the means for implementation.

1.5.1 Project Management

Each project team is organized based on tasks and levels of responsibility to ensure good communication between all personnel. The Project Managers have overall project oversight responsibility and provide direction regarding QA. Project Managers also provide direction to Project and Staff Scientists and Technicians. On larger projects, a Project Coordinator is used to ensure that adequate coordination and communication occurs amongst the Project Team. With input from the Professional Engineer, Professional Geologist, or other Principal/Associate level scientists within their area of expertise, the Project Manager is responsible for the project design and implementation. The Project Manager, the Project Coordinator, or other designee provides guidance and technical expertise as needed to those Project and Staff Scientists and Technicians who are in the field collecting data.

In addition to, and in concert with, the guidance and direction of the Project Manager or Project Coodinator, the Professional Engineer and/or Geologist provides instructions to field work teams on all aspects of the project, including QA management. Field teams typically consist of a Project Scientist and a Staff Scientist or Technician, as needed. The Professional Engineer and/or Geologist is responsible for resolving any issues raised by Project or Staff Scientists or Technicians. The Professional Engineer, Professional Geologist, and Principal/Associate Scientists report to the Project Manager, who will work with the Project Coordinator, and QA/QC Managers to ensure that the work is consistent with the overall QA objectives.

For each project, a Work Plan is developed to provide detailed and explicit instructions for the field team to follow when collecting the project data. The plan is reviewed, commented on, and approved by key parties before the beginning of sample collection. Reliance on a detailed, explicit, and fully reviewed Work Plan ensures that:

- Project objectives, methods, procedures, and details are completely thought out before sampling;
- Data will be collected in a systematic and consistent way throughout the project; and
- Every member of the project team adheres to the requirements of the plan. Each field team member is required to sign a statement that they have read and understand the plan. In particular, those directing the field staff must make sure that the field team(s) adhere to the plan.

The procedures specified in the Work Plan must be considered somewhat flexible by the field team(s) in certain circumstances. Many events can arise during field data collection that may require changes to the procedures being used. In these circumstances, deviations from the plan will be conducted only after consultation between the field personnel, Principal/Associate Scientist(s) within the relevant discipline, the Project Manager or Project Coordinator and the Professional Engineer and/or Geologist. Deviations from the Work Plan will be carefully documented, as will a detailed explanation as to why the deviations were necessary.

1.6. Data Generation and Acquisition

1.6.1 Data Quality Objectives

Project data must meet standards of precision, accuracy, completeness, representativeness, comparability, and sensitivity, and must be consistent with sound scientific methodology appropriate to the data quality objectives (DQOs).

Precision is defined as the level of agreement of repeated independent measurements of the same characteristic. Accuracy is defined as the agreement of a measurement with its true value. Completeness is defined as the percentage of the planned samples actually collected and processed. Representativeness is defined as the degree to which the data accurately reflect the characteristics present at the sampling location at the time of sampling. Comparability is defined as the measure of confidence with which results from a study may be compared to another similar data set. Sensitivity is defined as the ability of a measurement technique or instrument to operate at a level sufficient to measure the parameter of interest.

1.6.2 Personnel Experience and Training

Field construction and sampling teams receive explicit instructions in the execution of each Work Plan or task. They are instructed in the field before beginning each task, and the instructions are repeated or refreshed during the task as necessary. The Professional Engineer, Professional Geologist, Principal/Associate Scientist, or his designee with experience in the activities to be completed, usually directs all fieldwork.

Stantec field staff also are required to have the initial 40-Hour OSHA Hazardous Waste Worker Training, Annual 8-Hour OSHA Refresher Training, First Aid, CPR, and any client-specific health and safety training.

1.7. Assessment and Oversight

The QMP specifies that construction activities and field activities generating data will be audited to ensure that the project-specific plans are being properly implemented. Several mechanisms for internal audits of the data generation process are used for each study. These mechanisms generally include the following.

- A project management structure that defines clear lines of responsibility and ensures communication between field teams, the Project Manager, the Project Coordinator, and with the Professional Engineer, Professional Geologist, or other technical experts. Clear responsibilities and communication can serve as a means of providing internal audits of the sample collection process as it proceeds.
- A requirement that field notebooks and data forms be completed daily and reviewed weekly by the Project Coordinator in consultation with the Professional Engineer and/or Geologist.
- The use of pre-formatted daily construction documentation and data sheets that serve as a checklist for sampling procedures. These forms help to ensure that adequate construction documentation and sampling is complete.
- Sampling will not begin until approval is received from the Project QA/QC Manager or their designee. The Project QA/QC Manager or designee will conduct a field audit of procedures and documentation of the study.

1.8. Data Validation and Usability

Most field sampling events employ standard, repeatable methodology available in the scientific literature for collecting data. Project specific Work Plans are extensively reviewed for the adequacy of the sampling design and methods. The original field notebooks are maintained by Stantec and archived for the maximum period of time required by the client contract, the project regulatory, and the Stantec document retention policy. Data within reports can be reviewed against sampling records to ensure that the reports represent complete and accurate information. Analytical data are validated as specified in the QAPP.

The Professional Engineer and/or Geologist, in communication with the Project Coordinator, validates that Project and Staff Scientists and Technicians are completing data forms by performing periodic checks during the work. When possible, data collected are validated by photographs.

Table 1. Roles and Responsibilities of Key Positions within Stantec

Key Positions	Roles and Responsibilities	Accountable To
Chief Operating Officer (Senior Vice President)	• Ensuring that all staff have the resources necessary to perform their jobs well.	President and CEO
Environment Practice Area (Senior Vice President)	• Ensuring communication and understanding and implementation of the corporate Quality Management Plan	Chief Operating Officer (Senior Vice President)
Practice Lead-Environmental Remediation US (Vice President)	• Ensuring communication and understanding and implementation of the corporate Quality Management Plan	Environment Practice Area (Senior Vice President)
Environment Practice QA/QC Manager	• Responsible for issuing QMP and QA/QC guidance to PC Managing and Practice Leads within each PC • Responsible for the quality of final products developed by Environment Practice staff	Environment Practice Area (Senior Vice President)
PC Practice Lead	• Determines business plan, marketing and opportunities available for PC • Responsible for meeting PC goals, including budget and operational margins • Manages staff, including skill sets, recruiting and hires, schedules	Practice Lead-Environmental Remediation (Vice President)
PC Managing Lead	• Ultimately responsible for the quality of products produced by a PC • Analyzes business opportunities and participates in marketing activities • Ultimately responsible for achieving the budget and operating margin goals set for a PC • Manages staff skill mix, including recruiting and hiring, relative to strategic business operations • Manages PC Quality Systems Manager • Communicates and implements policies and decisions of upper management • Resolves conflicts to ensure effective project performance • Conducts program reviews • Ensures that project reviews are conducted by the Resource Managers	Regional Leader-US Great Lakes (Vice President)

Key Positions	Roles and Responsibilities	Accountable To
Project Manager	• Responsible for the quality of technical activities performed by personnel within their sections • Ensures that the Quality System is implemented by project personnel within his/her section • Ensures that sufficient resources, both time and staff, are available to meet the technical and quality objectives of projects • Ensures that all programs/ projects have an adequate QAPP or Work Plan prior to initiation • Conducts review of deliverables • Conducts project reviews • Ensures that SOPs that describe current practices are written, approved, available, and current • Ensures that staff are adequately trained to perform their assignments • Manages the financial performance of section as a portion of the overall PC unit (i.e., billability, business volume, capital expenditures, working capital, overhead costs) • Manages staff availability for project work and analyzes staff skill mix relative to business plan/opportunities. This includes recruiting, new hires, appraises performance, prepares staff development plans, and approves timecards/expenses • Ensures that project coordinators and task leads manage service delivery and staff performance to attain high quality performance by implementing the Quality System • Ensures that facilities and equipment are sufficient to support project needs • Ensures that effective communication with clients is occurring • Resolves resource conflicts to ensure effective project performance • Works with Market Managers to analyze business opportunities that require support from their sections. Contributes to marketing activities as needed, including managing and contributing to proposal preparation • Assists in the development of pricing strategies and estimating potential sales	PC Managing Lead PC Practice Lead
Project QA/QC Manager	• Performs final reviews on all SOPs, QAPPs, and work plans for external distribution • Schedules, plans and conducts audits and inspections of projects and facilities • Prepares written summary reports of audits and inspections for distribution to Project Managers and Stantec management	Project Manager and Environment Practice QA/QC Manager
Professional Engineer, Geologist, or Principal/Associate Scientist	• Reviews SOPs, Work Plans, QAPPs, and reports • Administers the SOP program including distribution, tracking, and archival • Maintain QA records in a secure location • Maintains training files for Stantec QA and technical personnel • Functions as a QA Officer on assigned projects	Project Manager

Key Positions	Roles and Responsibilities	Accountable To
Project and Staff Scientist	• Understand and implement QAPP, FSP, and SOPs • Review of FSP, SOPs with project team/task assignment/scheduling of deliverables • Development of internal draft deliverables • Tracking progress and technical proficiency of project team • Assist with development of final deliverables, following review of client comments on draft deliverables	Project Manager, Project Coordinator, Professional Engineer, Geologist, or Principal/ Associate Scientist
Technicians	• Responsible for understanding and implementing field surveys and data collection • Assist with project activities and share responsibility for the quality and success of data collection activities	Project Manager, Project Coordinator, Professional Engineer, Geologist, or Principal/ Associate Scientist

1.9. Signature Authority

Signature authority for controlled documents is as follows:

- The QMP is approved by the Practice Lead for Environmental Remediation, the Environment Practice QA/QC Manager and the Stantec Project Manager.
- SOPs that define site operations (e.g., QA procedures) are approved by the author, Project QA/QC Manager, and the Stantec Project Manager.
- SOPs that define technical procedures are approved by the author, a technical reviewer, the Professional Engineer and/or Geologist, and the Project Manager.
- Project-specific SOPs are approved by the author, Project QA/QC-Manager, and the Project Manager.
- QAPPs and Work Plans for internal distribution are approved by the Project Manager.
- QAPPs and Work Plans that are released to clients are approved by the Project Manager and the Project QA/QC Manager.
- Project deliverables are approved by the Professional Engineer and/or Geologist and the Project Manager prior to external distribution.

2.0 QUALITY SYSTEM COMPONENTS

It is Stantec policy that all Stantec projects be conducted according to the Quality System described in this QMP. The Quality System Process Flow is illustrated in Figure 2. The principal components of Stantec's Quality System include:

- A well-defined organizational structure with roles and responsibilities;
- Annual reviews and planning for all staff. This occurs as part of the Career Development and Performance Review (CDPR) process;
- Management assessments. This also occurs as part of the CDPR process;
- Corporate, PC, and project-specific training for all staff;
- A well-defined project planning process;
- Project-specific quality documentation; and
- Project and data assessments.

The following tools are used to implement the Quality System:

- QMP (Quality System documentation);
- Quality Systems audits (management assessments);
- Training plans (training);
- QAPPs (project-specific quality documentation), Work Plans, and FSPs;
- SOPs (Quality System documentation);
- The CDPR process; and
- Data verification and validation (data assessments).

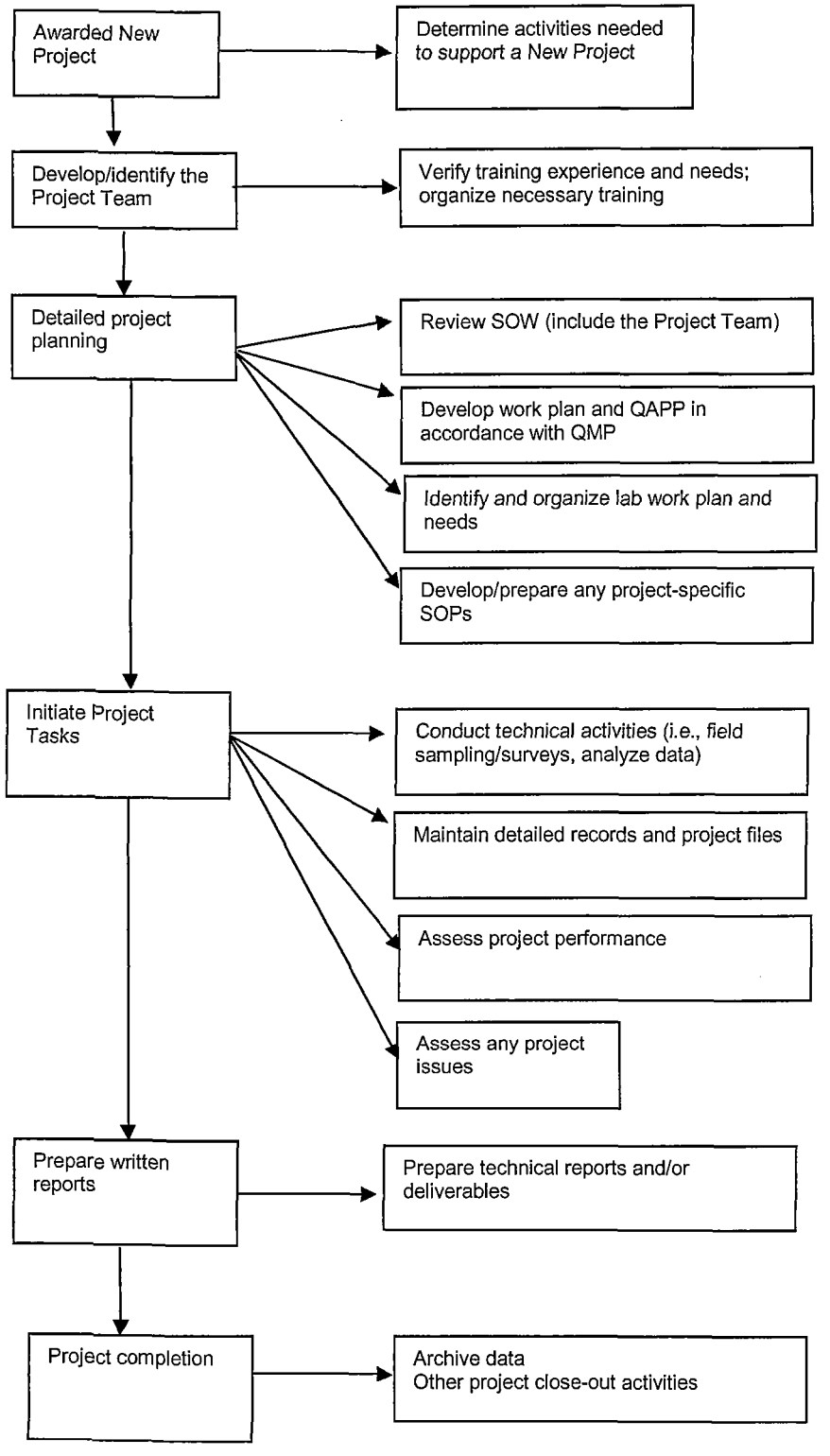


Figure 2. Quality System Process Flow

3.0 PERSONNEL QUALIFICATIONS AND TRAINING

Stantec employs a robust training program to ensure that all management and technical personnel are well qualified to perform their duties. Training falls into two broad categories that overlap, project management training and technical training. Project managers are taught to plan, organize, and manage the day-to-day activities of the project. This means "getting the job done right"; developing, communicating, and setting up the project plan; delegating responsibilities; establishing the project QMP; obtaining input as needed; motivating the team; and coordinating technical tasks and the production of deliverables meeting the scope, schedule, cost, and quality objectives. Project management training consists of virtual sessions on the Stantec web site, face-to-face training with Senior Project Managers in each PC, and follow-up training in person as needed to address specific initiatives. Regular feedback is also provided through the CDPR process. Technical training is similarly structured and includes virtual and personal training. Most technical skills require specific training sessions and are performed at PCs where specialized expertise occurs.

Any person performing a technical task must have demonstrated experience or must work under the supervision of an experienced person. These objectives are achieved by identifying personnel at all levels with the education and/or experience needed to perform an assigned task, by encouraging professional development through continual practical training, and by providing opportunities for professional growth in a team atmosphere. The Environmental Remediation Practice Lead, in conjunction with PC leaders, identifies training needs and provides support to implement training.

3.1. Training Requirements

General training requirements are identified with all new hires and then on an annual basis as part of the CDPR process. Project-specific training needs are initially identified at the beginning phases of each project and then further identified when the Work Plan is developed. The Work Plan will usually contain a project-specific QAPP, SOPs, and a FSP. Each may have unique features that necessitate training. The Project Manager and Project QA/QC Manager will identify training needs and will then implement a plan. Training is accomplished through academic education, direct hands-on experience with trained personnel, in-house seminars, and attendance at professional meetings and workshops.

3.2. Training Documentation

Training records for each staff member are maintained by the PC Managing Lead, who interacts with Human Resources to maintain training records. This process typically includes documentation of SOP-specific and in-house training, safety training, formal training, attendance at training seminars, and other evidence of professional growth. Certificates of completion and other records of training are included in individual personnel records.

The QA/QC Managers, PC Practice Lead, and Project Manager are responsible for ensuring that staff are trained in the Quality System requirements of the QMP, and that training is documented for their technical assignments. Each staff member is responsible for completing training for their assigned responsibilities and submitting training records and certificates to the PC Managing Lead.

4.0 PROCUREMENT OF ITEMS AND SERVICES

Stantec follows specific procurement procedures for consultant services and equipment to ensure that labor and materials meet project objectives as documented in QAPPs.

This section covers procurement procedures for Vender Contracts (i.e., material or equipment purchases). Project standards, levels of fiscal authority, and procedures vary with each client and project. A plan must be established with the client using the Stantec system, the client's system, or a combination of the two. Different projects will have different procurement requirements. For example, a public project is likely to be governed by certain laws or regulations that will specify the manner in which the owner of a public project may purchase goods. Similarly, some clients will have their own procurement procedures in place.

Stantec uses two primary procurement contracts:

- **Vendor Contracts,** which are usually activated by purchase order and are limited to the provision of materials or equipment; and
- **Construction Contracts,** which are usually activated by contract agreements and are used to purchase services, as well as materials and equipment.

4.1. Procurement Management

Procurement-related activities start with the establishment of management and control systems to ensure the efficient purchase, delivery, turn over, and commissioning of equipment and training-related materials. The Procurement Plan must be prepared in writing by the Project Manager or his designee and approved by the client before Stantec commences purchasing activities. The Procurement Plan is then communicated to the Project Team through the Project Implementation Manual.

4.2. Procurement Approvals

Procurement planning is followed by the development of procurement lists of equipment/materials identified as "List of Materials for Approval," which are reviewed and approved by the Project Manager and then forwarded to the client for funding allocation and purchase approval.

Purchase of startup equipment and materials should be the only exceptions to the normal procedures, and such purchases should be clearly identified for purposes of project approval.

Following are Stantec's typical bid requirements. Bid requirements and levels of approval will vary with the client's requirements and any applicable procurement laws/regulations. These must be established with the client before proceeding and must be described in the Project Implementation Manual.

- A purchase is deemed competitive when: 1) at least three different qualified suppliers have been invited to submit bids; 2) public notice has been given and at least two valid bids have been received; or 3) only one bid was received but fair value has been assured. Fair value is supported by published price lists and/or copies of invoices to other clients and by a fair price declaration.
- A purchase is deemed non-competitive if bids were not solicited or if bids were solicited

but the conditions of a competitive contract were not met.

- For purchases under $2,500, a minimum of two suppliers are invited to submit prices and supply quotations. In some cases, for small purchases of less than $500, only one supplier quotation is requested if the prices are supported by published price lists or if the prices are known to be those usually charged.
- For purchases between $2,500 and $25,000, a minimum of three suppliers are invited to submit prices and supply quotations.
- For purchases over $25,000, formal bids are requested from a minimum of three qualified suppliers.

For repeat orders, where the current price is not more than 10 percent above initial purchase order price, additional price quotations are not required. Wherever possible, the lowest compliant price and supply quotation should be awarded the purchase order. If the recommendation for a purchase order is made for other than the lowest compliant price and supply quotation, the selection must be in line with the stated bid evaluation process, and a full justification must be recorded on the procurement vendor file.

4.3. Procurement Process

The procurement process is composed of two phases, planning and implementation, and include the following activities.

4.3.1 Procurement Planning

Procurement planning consists of:

- Identifying and defining needs;
- Defining contracting strategy;
- Establishing responsibilities, routing, and time frames for issuing Requests for Quotations (RFQs) and receipt of bids;
- Defining and setting up the evaluation, clarification, approval, and payment process;
- Preparing detailed specifications and data sheets;
- Developing cost estimates of required items;
- Conducting market research;
- Identifying possible sources;
- Preparing a list of material for approval;
- For invitational bids, preparing a of list of suppliers for each item for approval; and
- Setting up a Procurement Register.

4.3.2 Procurement Implementation

Procurement implantation consists of:

- Issuing RFQs and receiving quotes;
- Evaluating quotes for accuracy and completeness;
- Issuing clarifications;
- Issuing Purchase Orders;
- Coordinating or carrying out manufacturing inspections and witness testing;
- Coordinating packaging and documents;

- Coordinating shipping and delivery;
- Performing QA, QC, and quantity verification;
- Coordinating inventory record keeping for all equipment;
- Coordinating hand over, start-up, and commissioning;
- Coordinating service/maintenance contracts;
- Coordinating equipment training where necessary;
- Approving payments and track budgets; and
- Administering/reporting all procurement activities.

4.4. Tracking and Reporting

A Procurement Register must be set up and kept current to list and track all procurement packages. The register will be set up and administered by the Project Manager or his designee. This register would usually include at least the following information: package (file) number, description, date RFQ issued, current status (e.g., RFQ, evaluation, committed, received, completed), name of supplier, delivery date, budget, expenditure committed, and variance. The procurement package number or Procurement Register information should refer to the procurement file number containing the procurement details (i.e., RFQ package, bids, evaluations, copy of purchase order, vendor submissions).

Procurement reports should be prepared to include the expenditures and commitments to date, variances from forecasts, and planned purchases for the next period. Procurement problems are identified and solutions proposed in the procurement reports. If a different procurement mode from that identified in the "List of Materials for Approval" is used, or if the mode utilized does not coincide with the appropriate financial limitations, a justification must be provided. Items purchased will be reported in the same sequence and description as used in the "List of Materials for Approval" to facilitate tracking. The report for each period will include procurement items, description of procurement, and supplier's name.

4.5. Sourcing

Sourcing for procurement will begin with an examination of whether the required goods/materials are available locally, in North America, or internationally. If products are available in more than one of these three locations, then an evaluation has to be made as to where the most practical and economical supply source is located, giving consideration to any technical or fragile property concerns with the equipment to be supplied. Sourcing can be done through newspapers, industry brochures and magazines, yellow pages, the internet, Thomas register, Fraser's trade index, and networking. Preference for equipment supply should be given to the supplier/manufacturer with a local dealer/representative capable of providing spares, performing after-sales service, and signing maintenance contracts. Clients may also wish to match brands to existing equipment to facilitate maintenance and simplify parts inventory.

4.6. Request for Quotation

Quotations will be based on the specifications and data sheets developed by the disciplines. A letter of invitation or procurement requisition with a fixed reply date will be sent to suppliers by hand, registered mail, courier, electronic mail, or fax. The method of evaluation and any preferential conditions should be defined in the same manner as construction contract tenders are called.

4.6.1 Quotation Documents

Quotation Documents are prepared on a case by case basis and generally include:

- Formal Invitation of RFQ;
- Instruction to Bidders;
- Form of quotation to be submitted;
- Time and place for receipt of quotes;
- General Terms and Conditions;
- Special Contract Conditions;
- Specification details;
- Technical data of goods/services requested, including QA and QC program;
- Company Health and Safety, EMR, and Prequalification Survey;
- Price Schedule to be filled in; and
- Required forms and warranties.

4.6.2 Quotation Elevation

Evaluation procedures must be established and communicated in the RFQ. This is part of procurement planning and is usually done with, or as directed by, the client. Typically, an evaluation spreadsheet is prepared to compare the technical information with the specifications and the other bids, as well as with other relevant conditions such as delivery date, manufacturing/supply location, warranty, and alternatives. In addition to the suppliers bid price, comparison of pricing may include indirect costs (i.e., soft costs) to the project. Indirect costs may be differences in maintenance and operating costs, loss of use due to longer delivery, special installation requirements, and additional required engineering required. The lowest cost compliant offer is typically accepted, unless doing otherwise better meets the stated evaluation criteria and can be justified.

4.7. Contracting Process

Purchasing Contracts will be in the form of numbered Purchase Orders issued by the client to the successful supplier. Purchase Orders will be entered into the Procurement Register, which is set up to track and report the procurement process.

Purchase Order terms and conditions must be in line with the RFQ terms. In cases where the item has to be manufactured or is not readily available, a delivery date is to be mutually agreed upon and cross-referenced to a liquidated damages clause, if applicable, in order to ensure punctual delivery. Inspections, testing, and delivery dates and procedures are set out and tracked.

4.8. Quality and Quantity Assurance

Where appropriate and when required, services and materials should be inspected, and testing should be witnessed by Stantec and/or the receiving or commissioning contractor(s) prior to acceptance of delivery either at the supplier's warehouse or at the client's or contractor's designated delivery point. No payment to the supplier should be authorized until all items listed on the Purchase Order are received, and quantity and quality are inspected and accepted.

Any nonconforming or defective items should be promptly discussed with the client and communicated to the supplier in writing. It is important to review the Purchase Order and any terms/conditions to ensure that any such notice to the supplier complies with the terms of the applicable agreement.

4.9. Risk Management

Risk management includes all measures that will have to be taken to prevent losses of funds, materials, equipment, and services.

Risk management is introduced by controlling the critical points in the procurement planning process in such a way that all risks are minimized and, where possible, contingency plans are put into place. The following are normal points of risk that should be addressed in the Procurement Plan.

- The preparation of complete and appropriate technical specifications and associated QA and QC documentation.
- Identification and communication of evaluation procedures and preferences.
- The development of appropriate, workable procurement policies.
- The scheduling of purchases and delivery.
- Timely customs clearance, delivery, inspection, installation, commissioning, start up and integration of all equipment supplied.
- Approval and payment of invoices.
- Site storage and hand over process.

There are risks at each point in the procurement cycle. The procurement planning process must address procedures to minimize these risks. Proper planning and control of the procurement schedule includes time buffers designed to account for the risks of delays in delivery from suppliers, the timing constraints of transportation (overseas and local), and customs clearance. When there are recognized consequences of failure or delay, financial security should be obtained from suppliers, such as a performance bond, letter of credit, liquidated damages, holdback, or staged payment structure. Due to the risks involved with the transportation of fragile equipment such as computers, electrical devices, and related materials to the job site, the client should be advised to seek advice on proper, specific "All Risk" insurance to cover possible loss or damage to such equipment/materials.

4.10. Delivery and Inventory Control

Setting an appropriate delivery schedule is an important part of inventory control and risk management. While it is important to have inspected and accepted material and equipment on-site when required for construction, it is equally important not to have delivery scheduled too far in advance. Delivery that occurs too soon prior to the start of a project increases storage area requirements, handling, and inventory control costs; increases risk of loss, damage, and weathering; and affects payment times and cash flow. Even if the contractor accepts delivery and responsibility, a missing or damaged component can affect schedule.

In addition, it must be made clear to suppliers, who many times want to move inventory from their site and improve their cash flow, that delivery in advance of the schedule will not be accepted. The best delivery schedule results in reduced storage and handling costs because

equipment and material are offloaded directly into place or into the construction activities rather than to a storage yard. Contractors and owners are in the construction or production business, not the storage and rehandling business. Both benefit from "just in time" delivery.

Receiving activities will take place when the equipment has been delivered to the job site before any unpacking or unloading takes place. The Project Manager will arrange to have appropriate persons, which may include Stantec staff, the client, and contractors, present when goods are unpacked. An inspector, designated by the Project Manager, will complete appropriate receiving forms indicating equipment description, transportation company, date received, any damage, where goods will be located, serial numbers, model numbers, and quantities of each item. Once this form is completed, the Project Manager, or his designee, will keep a record for field files and will forward a copy to the Procurement Manager. These forms will be used to update the Procurement Register.

It is preferable that the contractor be part of the inspection and receiving process, sign the receiving forms, and take possession of and responsibility for the material from that point.

Inspection Report, Site Damage Report, Material Receiving Report, Receiving Inspection Report and Over Short or Damage Report forms are available in Stantec's Field Management Guide.

5.0 DOCUMENTS AND RECORDS

5.1. Data Collection

It is Stantec's policy that records, including data, generated during the course of a project must be capable of withstanding challenges to their validity, accuracy, and legibility. In addition, data must meet high standards of precision, completeness, comparability, representativeness, and sensitivity. To meet this objective, data are recorded in standardized formats and in accordance with prescribed procedures and SOPs. Data records, such as field notebooks, are maintained as scientific documentation. The sampling of environmental media (e.g., surface water, soil, sediment, soil vapor, air) is expected to follow standard sampling procedures, including data collection forms that need to be filled out during field activities. These procedures are defined in specific SOPs, which may be modified for a particular project. All staff members whose responsibilities include recording data must be aware of, and adhere to, the stated procedures during the performance of their work. Data records may include data sheets and survey forms, as well as other pertinent and appropriate documentation. Use of a laboratory data management systems provide a measurement of precision, which can be ensured through the proper use available methodology and significant level of quality and assurance. Procedures for data validation, verification, and usability will be implemented where applicable.

5.2. Document Control

At Stantec, the QMP, Work Plans, QAPPs, field notebooks and/or logbooks, and SOPs are controlled documents. They are prepared and approved by scientific and management staff and include an effective date and a specific version number as a permanent part of the document. These controlled documents, with the exception of Work Plans and QAPPs, may not be copied for personal use.

5.3. Document Management System

Stantec requires that a hardcopy of project files be maintained. Stantec maintains operating procedures and policies related to maintaining electronic project files. Essentially, three types of records are maintained for each project conducted by Stantec.

- Business records: financial and accounting records, and business correspondence.
- Technical records: analytical data and technical correspondence. The Project Manager maintains technical records throughout the lifecycle of a project.
- Contract deliverables: formal Work Plans, QAPPs, reports, and data management files. The Project Manager maintains the contract deliverables as part of the complete project files.
- Project files will be retained by Stantec in accordance with client contract terms and other project retention requirements such as those contained in legal document such as a consent decree.

Once a project has been completed and officially closed, the technical records and project management files are archived in accordance with the Stantec records retention policy.

5.4. Standard Operating Procedures

It is a Stantec policy that SOPs be written for all routine procedures that affect the quality of products or services provided by Stantec. SOPs ensure the integrity, reproducibility, and quality of data and information, and must be clearly written with sufficient detail and must be available so that a qualified individual can perform the procedure independently. Procedures that are not routine or that are unique to a project may be described in the Work Plan, QAPP, project-specific SOPs, or written protocols included in the project files.

5.4.1 Preparation of Standard Operating Procedures

The goal of an SOP is to ensure consistency and accuracy of data collection and analysis and to maintain the highest level of quality possible. The need for a new or revised SOP may be identified by any staff member. The Project Manager is responsible for ensuring that SOPs are prepared in a timely manner and for providing the resources for their completion. A suggested SOP is approved and an author is assigned based on his/her technical knowledge of the subject matter. SOPs must completely and accurately describe the procedure(s) based on sound scientific principles or previously recognized methodology or procedures. SOPs are approved by a technical reviewer as part of the approval process.

Existing SOPs may require modification and revision, as well. All SOPs are reviewed biennially, or as appropriate. If changes are made to an existing SOP, the entire SOP is reissued under a new revision number. Revised SOPs are subject to the same review and approval process as new SOPs.

5.4.2 Distribution and Control

SOPs are available electronically on the local area network and can be located on a specified network drive. All SOPs (current, modified, retired, and historical) are maintained in a secure location.

SOPs contain proprietary information and are not to be distributed outside of Stantec except as required for performance of a project.

5.5. Work Plans and Quality Assurance Project Plans

It is Stantec's policy that a Work Plan or QAPP be prepared for every project. A Work Plan is a technical planning document that describes the specific project scope of work, management, details for accomplishing the scope of work, QA and QC activities, schedule of milestones and deliverables, and project budget. A QAPP must be prepared for major projects that involve the collection and use of environmental data, either as raw data or analytical (secondary) data. Smaller projects may incorporate these elements into the Work Plan. QAPPs include the elements of a Work Plan as stated above, in addition to procedures for measurements and data acquisition, project assessment and oversight, and data validation and usability assessments necessary to ensure that the project goals are achieved successfully. Either a Work Plan or a QAPP serves as a planning document to communicate project requirements to the designated project team; thus, the necessary work is performed and decisions are made in accordance with the scope and goals of the project. Work Plans and QAPPs are prepared, approved, and distributed to the project team prior to the initiation of the project.

5.5.1 Content and Format

A Work Plan or QAPP may be identified as a project deliverable. Therefore, the Project Manager needs to determine if any specific formatting is required of the planning document. QAPPs that are intended for external distribution generally follow EPA QA/R-5 (EPA 2006), which defines 24 elements as requirements. Additional project-specific requirements may also be defined by the client. If the QAPP will be prepared for internal distribution only and is not a specified project deliverable, then a simplified plan may be followed that combines a number of these elements and addresses the eight elements that are summarized in Table 2. In some cases, it is also possible that the project proposal contains sufficient detail to meet most of the Work Plan or QAPP requirements. In as much, a cover sheet that would provide additional information (e.g., project number) not necessarily known at the time of the proposal submission would be combined with the proposal as an attachment, and the appropriate proposal sections referenced for each Work Plan or QAPP element.

Table 2. Essential Elements of a Planning Document (Work Plan or QAPP)

1. General Project Information

Project Title
Project Number
Client
Effective Date of Work Plan or QAPP
Version Number
Project Manager
Deliverable Due Date(s) and Period of Performance

2. Objectives and Scope of Work/Work Breakdown Structure

Project goal(s), objectives, and the questions and issues to be addressed by the project.

3. Methods and Technical Approach

- For each project task, a detailed description of how the work will be performed, the documentation maintained, and the products delivered.
- The type of data needed and how those data will be used to support the project objectives.
- How the quantity of data needed was determined and how the criteria for the quality of the data were determined.
- How, when, and from where necessary data will be obtained, including existing data. Identifying any constraints on the data collection process. Identifying any data gaps.
- How the data for the project will be analyzed, evaluated, and assessed against their intended use and defined performance criteria.

4. Quality Assurance and Quality Control

Activities during the project that will be used to assess product quality, may include:

- field or laboratory quality control operations;
- measurement quality objectives;
- data verification, audits, and usability assessments; and
- document reviews.

5. Reporting

Project reporting requirements, including deliverables, and possibly progress reports.

6. Schedule

The project schedule, with milestones and deliverables, and the contract end date.

7. Project Organization and Communication

The project manager, the client organization and point of contact, the project personnel, any subcontractors, and the responsibilities of each member of the project team.

8. Budget

The project allocation of hours or dollars to tasks and individuals. (Budgetary information may not be part of external deliverables).

5.5.2 Secondary Data Collection

Secondary data collection may be a critical component for many projects. It is often necessary to evaluate and gather data from other sources, including but not limited to literature searches, databases, and other recognized sources, rather than to generate new data. This method of data use may elicit a critical flaw, in that using data from other sources does not necessarily allow for evaluation of, or provide information critical to assessing data quality. QAPPs for secondary data will follow the guidance provided in EPA QAIG-5 Table 9 (EPA 2006) for the preparation of QAPPs for secondary data. There are four major sections of the QAPP (Project Management; Data Generation and Acquisition; Assessment and Oversight; and Data Validation and Usability) that will be tailored to define the Quality System, QA, and QC procedures that are implemented for data gathering and analysis. The QAPP defines screening procedures to ensure that secondary data used for the project are correct for the project; project data quality specifications are adequate to ensure that appropriate data are used; data management and documentation procedures are adequate to ensure traceability; data and product assessment procedures are in place to ensure that work products are accurate, complete, traceable, and defensible; and data usability procedures are in place to ensure that the data meet the screening and quality specifications defined in the QAPP.

5.5.3 Review and Approval of Quality Assurance Project Plans

It is the responsibility of the Project Manager to ensure the preparation and approval of a Work Plan or QAPP, as well as to ensure that the Work Plan or QAPP is distributed to all project personnel. The review and approval of the Work Plan or QAPP by the Project Manager must be authorized by a dated signature within the actual document. If distribution of the Work Plan or QAPP is intended only to be internal, no other signatures are required. Work plans and QAPPs that will be distributed externally must also be reviewed and approved by the Project QA/QC Manager and, if appropriate, the Professional Engineer, Professional Geologist or other Principal/Associate Scientist in responsible charge of the work by documentation (e.g., an original signature on a formal approval page) that is incorporated into these documents. Neither draft nor final Work Plans or QAPPs may be distributed without at least the signature of the Project QA/QC Manager. Work Plans and QAPPs are generally distributed to the full distribution list once the completed approval page is received from the client. If the approval page is not received prior to the start of work, the Work Plan or QAPP may be distributed to the project team (internal distribution only).

5.6. Document Review Process

It is Stantec's policy that every contract deliverable should be independently reviewed to ensure that it is accurate, technically and grammatically sound; has objective interpretation, solid conclusions, and satisfying presentation; and meets or exceeds client expectations. The review will include a technical, editorial, and/or QA component, depending on the document and project requirements. The Project Manager usually will determine the type(s) of review appropriate for each deliverable. Reviews are documented as draft versions of reports, which indicate any issues identified.

All deliverables must be reviewed and approved by the appropriate Project Manager prior to distribution. At a minimum, this review should verify that the above-mentioned review process has been completed and documented. It is the responsibility of the Project Manager to ensure this process is followed and to maintain records of reviews as necessary

5.7. Data Archival

It is Stantec's policy that project and business records be archived in accordance with company requirements for document storage. In the absence of other requirements included in the contract, project data are maintained for three years. In the event that the ownership of Stantec is transferred or that the organization ceases operation, project data will continue to be maintained. If Stantec is abolished or ceases to exist for any reason, data will be returned to the client in accordance with the terms of the contract.

In the absence of other specified requirements included in the contract, it is Stantec's policy for electronic data that:

- Network data files, including project files, are backed up daily, weekly, and monthly as necessary. Full backups are saved for 1 year; and
- The Oracle database is backed up daily (incremental), weekly (complete), and monthly (complete). At the end of a project, backup files are maintained as required by project contracts or other legal requirements.

It is the responsibility of the Project Manager to verify that this data retention schedule is acceptable to the client. Longer retention requirements must be explicitly stated in the contract and Work Plan or QAPP. After the designated time, those data may be returned to the client (upon request and at client expense) or destroyed.

5.8. Chain of Custody

Field-collected samples are required to be recorded on a Chain-of-Custody form that accompanies the samples to the laboratory. The custody of samples, sample tracking, and integrity, are procedures identified by Stantec, and detailed in the appropriate SOP(s). Samples are stored in a limited-access area under the appropriate conditions, for the appropriate length of time (i.e., hold-time). It is Stantec's policy to ship samples as soon as possible to the analytical lab once they have been collected.

5.9. Handling Confidential and Proprietary Information

Stantec maintains a strict confidentiality process for all projects. Each staff member is educated about the policy through training and then regular communication. Confidentiality agreements are developed and executed on a project specific basis by the Practice Leader following a review by risk management. It is Stantec's policy that confidential information of Stantec or its clients must not be disclosed, intentionally or unintentionally, to anyone except those authorized.

It is the responsibility of the Project Manager to ensure that the requirements for confidentiality are defined in the Work Plan or QAPP, and to make the arrangements for stamps and locked facilities, if needed.

6.0 COMPUTER HARDWARE AND SOFTWARE

Stantec computers are managed by the Information Technology (IT) group within Stantec, which oversees the purchase, installation, testing, operation, maintenance, and decommissioning of all computers and related equipment. Stantec maintains an IT Service Center responsible for managing the corporate web site, both internally (i.e., database server running Oracle) and externally (i.e., the database server has connectivity through the Internet and dial-up access); providing IT support; and providing CAD support.

IT staff are responsible for ensuring that all hardware and software on all computers is legal. Each computer is assigned a number and then assigned to an IT staff member to manage the software and hardware on the computer. This process includes a legal review to make sure that all software is properly licensed. Once commissioned into service, IT staff are responsible for performing regular upgrades to software. These upgrades are done through the server and also on-site. As part of the update process, IT staff assess and document the impact of changes to users. This is an iterative process that involves computer users and IT staff.

Personal computers are used by most staff. These computers contain Intel-based Pentium or Xeon processors running a Microsoft operating system. Personal computers are purchased and maintained by Stantec on three-year cycles, allowing for regular upgrades. Hardware requirements are determined by computer users in conjunction with IT staff to ensure that each user has the proper type of computer needed to perform their job.

In short, IT staff are responsible for oversight of all computer support activities associated with the local area network Systems, including:

- Ordering and installing software and local hardware on the network and local personal computers;
- Maintaining software licensing agreements, and purchasing and maintaining service contracts on equipment where required;
- Troubleshooting and maintaining the local area network equipment and network printers;
- Assisting Information Management with software upgrades;
- Communicating with staff regarding virus alerts, system upgrades or downtimes, operating procedures, and system security;
- Administering the personal computer utility program for location and its regional sites;
- Maintaining the Microsoft Select CD library and a library of Stantec-owned software;
- Coordinating the installation and maintenance of network cabling; and
- Maintaining the Outlook Public Folders for location.

7.0 PLANNING

Stantec uses the EPA systematic process called the Data Quality Objectives (DQO) process for planning and implementing data collection activities. DQOs are the criteria used to design a study to ensure that technical and quality objectives for a project are met. DQOs are established for projects using EPA guidelines outlined in EPA Guidance for the Data Quality Objectives Process (QA/G-4) (EPA 2006). The process for establishing DQOs for a project are described in the QAPP. The project DQOs determine the types and numbers of samples collected per media, and the quality control samples required. In addition, data quality criteria and measures of acceptability that are appropriate for the project are

established and described. Both of these activities are based on the project goals, objectives, and questions and issues to be addressed.

Stantec's project team reviews the DQOs in light of project schedules, available resources, milestones and applicable requirements. During this process, the type and quantity of data to be collected are better defined, and this is based on how the data will be used to support the project objectives. The Project Manager, Professional Engineer, Professional Geologist, and Principal/Associate Scientists use an iterative process to implement systematic planning, the development of a QA Project Plan, the verification and validation of data, and finally the data quality assessment. Performance criteria are developed for each data collection and analysis component of a project using the following General Assessment Factors: Soundness, Applicability and Useability, Clarity and Completeness, Uncertainty and Variability, and Evaluation and Review.

The QAPP also contains Measurement Quality Objectives (MQOs) for environmental data, which include the desired sensitivity, range, precision, and bias of a measurement. Data quality is usually assessed through the parameters of accuracy, precision, completeness, comparability, representativeness, and sensitivity. These parameters are defined in the QAPP, as are the analytical method detection limits that will be used to determine if DQOs are met. The QAPP is developed by the project team based on the problem to be solved by the investigation.

Once data has been collected, a Data Quality Assessment (DQA) is performed to determine if the collected is adequate and usable, based on the project DQOs and MQOs.

8.0 IMPLEMENTATION OF WORK PROCESSES

Stantec's PC Leaders are accountable for the quality, performance, and success of the company as a whole through their management of the PCs that together form the company. In turn, they may delegate the responsibility for quality performance and success of any given project to a Project Manager or Project Coordinator, who becomes the project point of reference for the client. At Stantec, all work activities are conducted according to an approved Work Plan or QAPP. This process is coordinated by a Project Manager in conjunction with the rest of the project team. Project teams vary in size according to the size and complexity of a project. Project Manager responsibilities are many and vary from project to project but can be summarized in four general areas.

- Client Relations: Regular communication with the client to understand the scope, project area, and objectives.
- Production: Plan, organize and manage the day-to-day activities of the project. This means "getting the job done;" developing, communicating, and setting up project Work Plan; delegating responsibilities; establishing the project QMP; obtaining input as needed; motivating the team; coordinating technical tasks and the production of deliverables; and meeting the scope, schedule, cost, and quality objectives.
- Control: In concert with PC Leaders, assign and manage resources to execute the work in accordance with the project schedule. Ensure that appropriate senior individuals check and review evaluations, conclusions, and deliverables so that the product quality meets Stantec and industry standards for the practice of engineering, geology, or other professional services provided; and
- Financial Management: Start with a written agreement that clearly defines the terms

under which services will be provided. Achieve budget through effective control of the work and prompt identification and submission for formal approval of all scope changes. Make sure that the budget is suitable for achieving DQOs.

Some of the specific duties with respect to the client are to:

- Lead or participate in the preparation of proposals, particularly in the area of defining the project scope of work, team formation, fee estimate and schedule;
- Lead or participate in presentations to secure client acceptance;
- Lead service agreement discussions with client and subconsultants;
- Prepare client and subconsultant professional service agreements to clearly define scope of services, deliverables, schedule, fees and payments, exclusions, liabilities, responsibilities, and insurance;
- Ensure our services meet the agreed upon scope, technical, schedule, financial, and quality criteria;
- Inform client of additional Stantec services required or changes to the original scope of work immediately as they arise, and confirm them by means of a written amendment to the scope of work;
- Understand and respond to the client's business objectives and organization, people, and sensitivities;
- Keep client up to date with regular communication and formal written status reports;
- Issue and place on file written documentation of all discussions, clarifications, directions, and changes with the client or third parties. Use the Telephone Discussion Record form to record verbal communications;
- Schedule and record all meetings (see Stantec Templates for Meeting Notes and other standard templates);
- Monitor the performance of client responsibilities under the Agreement for Services and communicate deviations to client; and
- Implement any Stantec policies and procedures having to do with client relations.

Some specific duties with respect to Stantec Management include:

- Preparing and executing a detailed project Work Plan;
- Preparing, checking, and forwarding Services Agreement for approval and signing by Client and Stantec;
- Putting in place and successfully managing the project team organization;
- Ensuring the project success factors are achieved;
- Implementing Stantec policies affecting project team activities;
- Setting up appropriate documentation requirements and document control procedures;
- Establishing internal QA and QC procedures;
- Providing financial management of project; establishing appropriate review frequency, and comparing progress to expenditures, budget, schedule, and scope; proactively modifying plan when required to maintain budget, margins, and schedule; and promptly issuing Project Scope Change Notices and obtaining formal client approval; and
- Discussing deviations from Stantec policies with PC Leaders prior to action.

Some of the specific duties with respect to the Project Team include:

- Assembling the required staff for the team;
- Continually communicating with PC Leaders with regard to optimizing project staffing and meeting quality objectives;
- Briefing the team on client objectives and issuing full and clear instructions as related to project scope, deliverables, budget, schedule, documentation, and client directives;
- Preparing and distributing a project Work Plan for all projects;
- Reaching an acceptable consensus for the work efforts required by the team;
- Initiating project procedures and reporting, and modifying as needed;
- Making the final decision (after internal consultation with Stantec resources, if necessary) in matters of technical performance relative to procedures and deliverables, consistent with Agreement requirements;
- Reviewing and approving all time and disbursements expended on project;
- Ensuring that all company policies are implemented and that the defined project documentation systems are in place; and
- Participating with PC Leaders in determining individual performance ratings.

9.0 ASSESSMENT AND RESPONSE

Stantec utilizes several assessment tools to monitor quality systems management. These include quality systems audits; management systems reviews, technical reviews, performance evaluations, and DQAs.

9.1. Quality System Audits

Quality system audits can occur at two levels, one at the operational level with the Environment Practice QA/QC Manager and the PC Practice Lead, and the other at a project level with the Project QA/QC Manager and the Project Manager. The QA/QC Managers may provide technical and data quality review services to multiple PCs based on need and type of work being performed. These reviews are coordinated based on the technical scope of work, the experience of staff performing the work, and their familiarity with Work Plans, SOPs, and QAPPs for a specific type of data collection. The QA/QC Manager audits can occur remotely through document and data review, which is supplemented by conference calls, or they can occur in person and on-site. If there is a technical error identified, an investigation takes place to find the source and cause for the error, and to find a corrective measure. As needed, Work Plans, SOPs, and QAPPs are revised to preclude reoccurrence of the error.

An annual assessment of the Quality System is conducted as part of the review of the QMP. During the review, the Project Manager and key members of the Project Team assess the adequacy and implementation of the Quality System and make recommendations needed for improved effectiveness. The Project Manager, or his designee, is responsible for initiating the annual review and for assisting management in identifying needed changes to the Quality System.

9.2. Management Systems and Technical Reviews

Stantec reviews its management systems annually during the CDPR process to establish the level of competence, experience, and training necessary to ensure that personnel conducting assessments are technically knowledgeable. During this review, any potential conflict of interest is identified and managed by removing the conflict.

Each Stantec employee is responsible for performing a task. Management personnel involved with construction oversight or data collection are required to have the ability and competence to develop and implement Work Plans, QAPPs, SOPs, and FSPs. At least annually, each employee's performance is evaluated in relation to how well they performed. This review is conducted by the employee's supervisor with input from the PC Practice Lead and others at all levels with whom they have closely worked over the period. These individuals have the freedom to identify quality problems and noteworthy practices; propose recommendations for resolving quality problems, and independently confirm implementation and effectiveness of solutions.

9.3. Performance Evaluations

The CDPR process provides a written record by management of an employee's performance as it relates to their job and to Quality Systems. If corrective measures are necessary, the means and schedule for implementing are spelled out in the CDPR. Changes needed to the Quality System are communicated to the Professional Engineer, Professional Geologist, other Principal/Associate scientists, and to the Project Manager, who then develop and implement a solution to correct the problem.

9.4. Data Quality Assessment

All environmental measurement data collected directly by Stantec or a subcontractor are reviewed and approved before release to the client to ensure that the data are complete, accurate, traceable, and defensible. DQAs include recalculation of representative reported data values and comparison of the reported data to the DQOs and MQOs to verify that the data meet the specifications of the QAPP. The results of the DQAs are documented in a written report, which summarizes the results of the DQA and identifies specific improvement activities to correct deficiencies. The Project Manager is responsible for addressing all issues noted during the audit.

10.0 QUALITY IMPROVEMENT

Stantec staff are encouraged to identify ways to improve the quality of construction and data collection and other work products. There are multiple levels of responsibilities both from the top-down and bottom-up. Environmental Remediation Practice Leaders are responsible for setting the tone at an organizational level to ensure that all staff have the direction and resources necessary to perform quality work. PC Leaders and Project Managers are responsible for overseeing most construction and data collection activities on projects; therefore, they need to ensure that provisions are in place to ensure high quality construction and data collection. In particular, these individuals need to ensure that quality is maintained, and where there are issues identified, they need to assess the situation and take corrective action as soon as practicable. As part of this process, SOPs, Work Plans, QAPPs, and other guidance documents need to be revised to ensure that issues are not repeated.

Project Managers and PC Managing Leads are responsible for implementing improvements to prevent the reoccurrence of problems and to communicate lessons learned to other project managers. The Environment Practice QA/QC Manager is responsible for monitoring Stantec activities, identifying the need for corrective action, and working with Stantec management to implement improvements.

Project Managers are responsible for the resolution of disputes. Every effort will be made to address client concerns that fall within the project scope. Disputes that are outside the project scope or otherwise cannot be resolved by the Project Manager will be referred to Stantec Management for resolution.

11.0 REFERENCES

ANSI/ASQC E4-1994. Specifications and Guidelines for Environmental Technology Programs (American National Standard). January 5, 1995

EPA. EPA Requirements for Quality Management Plans. March 2001

EPA. Checklist for Reviewing EPA Quality Management Plans. EPA Order 5360.1.A2. September 2001

EPA. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA QA/G-4. 2006

APPENDIX A

Quality Management Plan (Equivalent) Acknowledgement and Agreement Form

Stantec

APPENDIX A
QUALITY MANAGEMENT PLAN (EQUIVALENT) ACKNOWLEDGEMENT AND AGREEMENT FORM

This Quality Management Plan [Equivalent] (QMP) has been developed for the purpose of informing Stantec employees of the project organizational structure and the processes and procedures to be followed throughout the implementation of the project.

I certify that I have read and understand the QMP and my role in the project structure.

Name	Title	Signature	Date

Stantec

Name	Title	Signature	Date